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Operational Risk: Measurement Issues, Basel-II and UAE banks

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ABSTRACT

Operational risk is as old as the banking industry itself and yet the industry has only recently arrived at a definition of what it is. Still the controversy about the definition is not over. Ever since the Bank of International Settlements (BIS) adopted a new set of regulatory capital standards, organizations have begun identifying and evaluating methodologies to measure operational risk. The guidelines of the BIS are quite lucid about what constitutes operational risk. It is proved without doubt that the operational risk management improves the quality and stability of earnings, thereby enhancing the competitive position of the bank and facilitating its long term survival. The collapse of Bearings and the derivatives disasters were one among several factors that led to the revision of Basel-I and giving the due importance to operational risk measurement and management. But the problem lies in the standard measure of operational risk.

The BIS major emphasis on regulatory capital has created adequate interest and motivation in the measurement of the Operational risk. While capital is important, it is merely one defense against risk and is unlikely to be the preferred solution. An increase in capital will not in itself reduce risk; only management action can achieve that. The control of operational risk is fundamentally concerned with good management, which involves a tenacious process of vigilance and continuous improvement. To quote Mr. Jacques Longerstaey, managing director of Putnam and GARP's Risk Manager of the year for 2005 "One lesson that all of us have learned in the financial services industry is that problems have been management problems –not risk measurement or identification problems. In a number of cases, we have seen clear evidence of shortcomings in processes being a result of lack of management enforcement rather than of a lack of identification or measurement."

Operational risk management can be said to move through three conceptual stages of development. The first stage is the sound management practices; the second stage is concerned with data collection and analysis; and the third stage involves modeling and predicting the future. The most important and difficult task in the quantification of operational risk is to find a reasonable model for the business activity. There is a growing dissatisfaction as far as the Basic Indicator approach and the Standardized approach are used to calculate the regulatory capital for Operational risk. The important step in the measurement of operational risk is the collection of internal loss data for operational risk, but it still reflects what has happened in past. Data quality and data frequency are some other important issues. The reservations of US central bank on the implementation of the Basel 2 and also because of the QIS 4 the Basel 2 implementation seems difficult on time.

The present paper tries to evaluate the existing quantification models and would like to recommend the model for the UAE banks that satisfies the supervisors and BIS.

INTRODUCTION

Operational risk is as old as the banking industry itself and yet the industry has only recently arrived at a definition of what it is (Fitch Ratings special report 2004). Still the controversy about the definition is not over. "Management of specific, or common or day-to-day operational risks is not a new practice; it has always been important for banks to prevent fraud, maintain the integrity of internal controls and reduce errors in data transaction processing, ensuring the availability of information technology infrastructure and their back up systems when needed" (Jayamaha, R 2005). The awareness of the operational risk has increased many fold after the release of the Basel II consultative documents. "Ever since the Bank of international Settlements (BIS) adopted a new set of regulatory capital standards, organizations have begun identifying and evaluating methodologies to measure operational risk. The guidelines of the BIS are quite lucid about what constitutes operational risk" (Rao, Narasimha 2005).

It is proved without doubt that the operational risk management improves the quality and stability of earnings, thereby enhancing the competitive position of the bank and facilitating its long term survival. "Today risk managers believe that about 30% of the risk a financial institution runs is due to operational losses" (Cruz, Marcelo 2003). Therefore it is essential and desirable to manage operational risk at the earliest opportunity.

"Operational risk management is a subtle, complex and often qualitative concept. There are four key factors that are central to most research on Operational Risk Management (ORM). These are:

1. ORM is a process
2. ORM belongs to everyone in the firm
3. ORM requires qualitative and quantitative data
4. ORM needs sponsorship from the top

ORM is about the effective use of resources through improved process efficiency, establishment of a sound system of internal controls the sharing of knowledge and good practice leveraging of technology to collect and analyze internal and external data, and prioritization of efforts" (Mestchian, Peyman 2003).

Defining Operational Risk

Operational risk is defined by the Basel Committee on Banking Supervision (2006) as: "the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. This definition includes legal risk but excludes strategic and reputational risk" The definition above is fundamentally focused on operational events, underlying causes and only has a downside. Some experts reduce the Operational risk taxonomy to operations risks or just three, namely, People risk, Process risk and Technology risk. Operational risk (OP risk) is not limited to the operations functions but is found across the entire organization including the operational risk management function. "Operations risks" due to operations or processing centers in an organization are the part of operational risk. To quote Iyer, Jaidev: "The biggest thing has been the struggle to make sure OP risk does not get bedded into separate silos of its own. The OP risk is omnipresent; even the administration of market and a credit risk policy is all about OP risk" (Oprisk & compliance 2006). Horst Simon believes that the operational risk is primarily human in nature. "Unfortunately people risk is often complex, subtle and extremely difficult to manage. However one can mitigate people risk by implementing and maintaining four pillars: leadership, self-actualisation, spiritual needs and proper policies" (Simon, Horst, 2004). Jayamaha, R (2005) categorizes operational risk into two, i.e. man-made risks (mistakes, faulty models, frauds, terrorism, wars etc.,) and god-made risks (earthquakes, floods, Tsunami etc.).

Basel II And Operational Risk Management

Basel II is distinct because of its emphasis on operational risk. The current Basel I capital framework has served the industry quite well for approximately twenty years but the growing complexity and sophistication in products, services and operations required an improvement in the existing framework. "One of the major improvements in Basel II is the closer linkages between capital requirements and the ways banks manage their actual risk. Basel II is intended to improve the regulatory capital requirements in addition to the other two pillars namely; the supervisory review and the market discipline" (Bies Susan Schmidt 2006).

Basel II has catalyzed the financial industry to understand and act on operational risk. The BIS major emphasis on regulatory capital has been a prime motivator in the measurement of Operational risk. While capital is important, it is merely one defense against risk and is unlikely to be the preferred solution. An increase in capital will not in itself reduce risk; only management action can achieve that. To quote Dingley Gary, the Operational risk executive of the year, 2006: "Ultimately, the Operational risk framework should not merely be Basel-compliant-it should also provide the bank with mechanisms for improving overall risk culture and behavior towards operational risk management. Understanding our risks should lead to better decision making" (Oprisk & compliance 2006). The results of the April *Oprisk & compliance intelligence* survey sponsored by risk consulting firm Protiviti, shows that the business benefits of an operational risk framework are gradually being understood and are in fact becoming drivers for the Operational risk projects in many firms.

The control of operational risk is fundamentally concerned with good management, which involves a tenacious process of vigilance and continuous improvement. To quote Mr. Jacques Longerstae, y,

managing director of Putnam and GARP's Risk Manager of the year for 2005 "One lesson that all of us have learned in the financial services industry is that problems have been management problems –not risk measurement or identification problems. In a number of cases, we have seen clear evidence of shortcomings in processes being a result of lack of management enforcement rather than of a lack of identification or measurement."

Operational risk management has three fundamental steps. The first step is the sound management practices; the second step is about data collection and analysis; and the third step involves modeling and predicting the future. The most important and difficult task is the quantification of operational risk based on a reasonable model for the business activity.

Measurement Of Operational Risk

The collapse of Barings, Sumitomo, Orange County, etc. and a number of derivatives disasters were one among several factors that led to the revision of Basel-I and giving the due importance to operational risk measurement and management. But the problem lies in the standard measure of operational risk. The Basel Committee on Banking Supervision(2006) has outlined three methods for calculating operational risk capital charges in a continuum of increasing sophistication and risk sensitivity:(a)the Basic Indicator Approach;(b) the Standardized Approach; and (c)Advanced Measurement Approaches(AMA). The banks are encouraged to move along the spectrum of available approaches as they develop more sophisticated operational risk measurement systems and practices.

The Basic Indicator Approach (BIA) allows the banks to hold capital for Operational risk equal to the average over the previous three years of a fixed percentage (alpha) of positive annual gross income. Negative and zero gross income are excluded from both the numerator and denominator when calculating the capital. Gross income in its simplest form is defined as net interest income plus net non-interest income. This is the simplest of all the methods to maintain the Operational risk capital. The method is based on a simple premise that higher the gross income, larger the operational risk, which might not always be true. Most of the supervisors (For example: India, Pakistan, UAE, Taiwan, Mexico, Turkey, KSA and many more) in different countries have decided to go for this approach because of its simplicity in calculation and ease in adapting to Basel II rule (See Global Risk Regulator, 2006). But the question remains –How far this approach helps banks in the management of Operational risk?

Some of the supervisors have announced that their banking structures shall prefer the Standardized approach because of the business lines division of the banking activity. The idea of business line division of operational risk is because of the ownership of the operational risk. "For operational risk the question of who "owns" or is responsible for the risk. One possible answer is that the business lines own it, in which case ownership of operational risk is aligned with the profit centre and the risk takers. This is intuitively obvious for credit and market risk with the transaction related focus .The same approach can be applied to operational risk even though some operational risks are not related to transactions but are environmental" (Hubner, Laylock and Peemoller 2003). In the standardized approach, the capital charge for each business line is calculated by multiplying gross income by a factor (beta) assigned to that business line. The total capital charge is calculated as the three year average of the sum of the capital charges across each of the business lines in each year. In the business lines the highest beta factor (18%) is with corporate finance, trading & sales and payment & settlement, while the lowest (12%) are with retail banking, retail brokerage and asset management.

Banks with different exposures on different business lines shall have different capital charge that seems quite sensible based on the industry experience of losses because of Operational risk from various business lines. There is a growing dissatisfaction as far as the Basic Indicator approach and the Standardized approach are used to calculate the regulatory capital for Operational risk. These approaches are top down methods and based on the proxy figures of industry wide sample data on operational losses and also are not risk sensitive.

Advanced Measurement Approaches (AMA) is the most scientific method of the measurement of Operational risk in terms of continuum sophistication and risk sensitivity wherein the regulatory capital charge will equal the risk measure generated by the banks' internal risk measurement system using the quantitative and qualitative criteria for the AMA. The loss model approach is the most used by the internationally active banks in developed economies. "The Actuarial loss model approach has become accepted by the industry as the generic AMA for the determination of operational risk regulatory capital for the new Basel II accord" (Alexander, Carol 2004). The Basel Committee on Banking Supervision (2006)

clearly outlines the standards to qualify for use of the AMA. The standards are three types: General standards, Qualitative standards and the Quantitative standards. The General standards require a bank to have an actively involved board of directors and senior management in the oversight of operational risk management framework, an operational risk management system and the sufficient resources in the use of the approach. "Three characteristics of AMA are worth noting here. One is that there is no prescribed formula or calculation except the horizon of one year and confidence level of 99.9%. The second is the combination of quantitative and qualitative elements and third is that AMA is as much about managing operational risk as of measuring and calculating regulatory capital for operational risk" (Rao, Vandana and Dev, Ashish 2006). Before going full fledged on the AMA, a bank must scrutinize all its requirements and implications. "In order to build an AMA framework, four elements have to put in place. These are: *Qualitative adjustments*, (which means control self assessment) *internal data*, *external data* and *Scenarios*" (Quick, Jeremy 2006).

Internal loss data is about the frequency and severity of loss history of a bank due to operational risk events. The important step in the measurement of operational risk is the collection of relevant internal loss data for operational risk for a period of at least five years. The data must be comprehensive, relevant and clearly linked to its current business activities. Data quality and data frequency are some of the other important issues. There are some problems in applying the actuarial approach in the measurement of operational risk. These are:

- The problem of best fit distributions on frequency and the severity loss data: Various statistical techniques can be used to determine the best fit to the event data. (For example, gamma normal, Pareto and Lognormal are a few for severity, since severity distribution is clearly long-tailed. For frequency distributions Poisson is justified, when empirical evidence shows equality of mean and variance and negative binomial, when the variance is significantly larger than the mean. The Poisson-lognormal is considered the standard).
- Combining the frequency and severity distributions into one.
- The level of granularity and the threshold limits: The typical threshold limit used by many banks is US\$10, 000, except perhaps for the branch banking, where a lower threshold limit can be justified.
- Correlation issue: There is a strong argument that there is some positive correlation between operational events and also between market risk, credit risk and operational events.
- Loss history is backward looking.

In the Actuarial approach to loss measurement, Key Risk Indicators (KRIs) play a very significant role. KRIs can be extremely useful in the measurement and management of Operational risk. KRIs is measurable metrics or indicators that track exposure or losses. KRIs is especially valuable for high frequency, low severity types of events and processes. They are most useful when the volume is high, says the Michael Haubenstock of Sun Trust Mortgage. To quote Iyer, Jaidev: "But one should also understand that KRI is not a measure of risk, it is an indicator of riskiness" (Oprisk& compliance 2006). Vanadana Rao and Ashis Dev (2006) in their paper outline four characteristics of KRIs of Operational risk that are not only desirable but also critical:

1. A KRI has to be a measurable quantitatively;
2. A KRI has to be statistically robust predictor of the probability of the occurrence, if not the severity, of an operational risk event;
3. KRIs for each major operational event category have to be limited in number, say twenty because of pragmatic and statistical reasons; and
4. It has to be possible for the Operational risk manager to affect the value of a KRI over time.

Sobehart, Jorge (2006) divides the KRIs into four different categories: coincident indicators (a proxy measure of a loss event in the absence of actual loss data); causal indicators (a fundamental variable describing the cause of risk); control effectiveness indicators (a performance metric of risk controls); and volume indicators (a proxy value for the business complexity that indicates the likelihood or severity of a risk event). KRIs can be used in constructing the model for the loss severity.

External loss data is extremely important to understand the full picture of possible operational event at any given point in time. The external loss data is a public data or the pooled industry data but have their own share of problems. These are as follows:

- Statistical basis to combine the internal data with the external data and the scaling issues. Alvarez, Gene (2006) believes that because of quantitative imperfections, the mixing of internal and

external data should be avoided but the external loss information is valuable to risk managers as a qualitative educational tool.

- “Public databases have different biases like; “*disclosure bias*”: refers to an institution’s unwillingness or inability to publicly reveal losses,” *reporting bias*”: Even when incidents are disclosed, they may not be reported in publications that are widely available and “*search bias*”: an individual’s ability to research and record all losses in the public domain” (Alvarez, Gene 2006).
- Consortiums need to be formed in countries to get external data at one place with minimum of biases. The USA had the first of its consortium the Multinational Operational Risk Exchange (MORE) and of late the Operational Risk Exchange (ORX). In May 2006, a new consortium called DakOR (Datenkonsortium operationelle Risiken) launched its operations with nine German banks with an objective to share operational risk loss data. Many more consortiums are needed in near future to model operational risk losses.

Scenario analysis broadens the data set to understand and gauge the operational risk events on different plausible scenarios. It gives an opportunity to think outside the box. They help in making AMA futuristic and thus are important from the point of view of organizational efficiency and calculating economic capital.

Qualitative adjustment is all about the business environment and the internal control factors. A bank’s risk assessment methodology must capture key business environment and internal control factors that have an impact on the operational risk profile. This is a forward looking approach and shall improve the quality of risk assessment and modeling. The Basel Committee on Banking Supervision (2006) outlines the standards to use the internal control and business environment factors, which mainly focus on the choice of factors that can be justified as a meaningful driver of risk, the sensitivity of a bank’s risk estimate to changes in the factors and the framework of its application.

Symptoms of power law behavior are observed when modeling operational risk data. Therefore power law can also be applied to explain the operational loss frequency and the severity. “A very simple way to apply power law is to show frequency as a function of loss size in a double log plot. Frequency of large losses is inversely proportional to loss size or to a power of loss size. This implies that the remote probability of a multi billion dollar losses can be extrapolated from the observed frequency of smaller, more frequent losses. For example, if a bank experiences 10 loss events over per year that are over US\$1 million each, simple power-law behavior with a tail exponent of 1 would predict that a loss event over US\$100 million will be observed once every 10 years” (Koker, Rudi De 2006). Rudi also proposes a very simple formula to maintain the regulatory capital based on the power law. One should visit Rudi’s paper to have a complete understanding of the application of power law and the Extreme Value Theory (EVT) to model operational losses.

UAE Banks, Basel II And Operational Risk

In this research, an attempt has been made to probe the best suitable method to measure and calculate operational risk capital for banks in the UAE. As on 31st of January, 2006 there are 46 commercial banks in UAE; out of which 25 are foreign and the rest are local banks. Most of the banks are medium and small sized, localized in their operations and have high credit exposure on retail and corporate sector. Banks in the UAE have a relatively short history of collecting and reporting data on various activities. Operational risk data in the industry is scarce keeping in mind the tradition of being secretive and also not having a framework or system to store and analyze. There has been a lack of emphasis on collecting and making data public. Of late, there has been a growing concern among the banks about the risk management issues probably because of the Basel I accord. So to say the driver of the risk management practices in the UAE has been the Basel accord and to a small extent some cases of fraud, money laundering and the corporate default. The central bank of UAE has been quite sincere about the regulatory capital issue. In a circular in 1993 the central bank of UAE implemented the Capital Adequacy guidelines for all the banks operating in UAE.

“All banks operating in the U.A.E. must maintain a risk assets ratio at a minimum of 10% at all times, in which tier 1 capital must reach a minimum of 6% of total risk Weighted assets, while tier 2 capital will only be considered up to a maximum of 67% of tier 1 capital” (Central bank of UAE circular no.13/93).

When we analyzed the banks publicly available information on capital adequacy, we find that the industry is over capitalized. Based on the available data of 31 out of 46 commercial banks, the average

Capital Adequacy Ratio (CAR) was 26% in 2000, and 22.9% in 2004. Most of the banks are maintaining the CAR well above the central bank prescription of 10%. Some banks have CAR close to 100% and even more. The largest bank of the UAE i.e., the National Bank of Abu Dhabi has maintained the CAR well above 15% for the last five years, while a very reputed bank the National Bank of Dubai has progressively reduced the CAR from 42% in 2000 to 26% in 2004. It's a irony that some banks in their annual reports treat a higher capital ratio as something very healthy and they pat their own efforts of doing so without realizing the opportunity cost and the negative impact of higher capital on shareholders returns. Therefore capital is not a major issue as far as the Operational risk charges are concerned but it would be prudent for the banks to apply Basel II accord in a way that increases their operational efficiency, minimizes operational errors, frauds and reduces the capital charge so to have a favorable impact on the return on capital. This has strong macro benefits as well. The central bank of UAE has already announced the implementation of Basel II accord. To quote the Governor of the central bank of UAE "Last year, we arranged high level meetings with Bank CEOs to discuss our program for Basel II. Our program was divided into stages; stage one was for raising awareness through short seminars, which we have done six of them since the beginning of 2005. Now we are embarking on stage two, which is a market study and taking early steps of implementation. This will take most of 2006. We intend to engage the services of a professional company at this stage. Central Bank examiners have good practical experience in the areas to be covered under Basel II, and they will undertake a lot of work relevant to Basel II as well. The third stage which is the trial implementation stage will start in 2007. During 2006, we will work on Corporate Governance, as it is an essential element for the successful implementation of Basel II" (Speech delivered by the Governor on 29th November 2005 in a retail banking conference in Dubai). The commercial banks have already started setting up their risk management framework knowing the fact that on operational risk front the capital calculation shall be based on the BIA. With the supervisory approval some large and medium sized banks can opt for the standardized approach as well. Keeping in mind the availability and the quality of the operational risk data the AMA is ruled out at the moment.

We examined the impact of the Basic Indicator Approach on the banks operational risk capital charge. The aggregate gross income of all the commercial banks was approx. 20 billion AED in 2005, therefore the operational risk capital charge based on the BIA shall be 3 billion AED, which appears to be on the higher side looking at the banks exposure. Since most of the UAE commercial banks have exposure in retail and commercial sectors, we find the application of Alternative Standardized Approach (ASA) more suitable than the BIA. The ASA method has twin benefits: one, in the reduction of the operational risk capital charge and two, an opportunity to create an operational risk framework, which results in the real benefit to the banks and the economy in the long run. The ASA guideline as mentioned in the Basel document is as follows: "At national supervisory discretion a supervisor can choose to allow a bank use the Alternative Standardized Approach (ASA) provided the bank is able to satisfy its supervisor that this alternative approach provides an improved basis, for example, avoiding double counting of risks. Under the ASA, the operational risk capital charge is the same for the standardized approach except for two business lines-retail banking and commercial banking. For these business lines, loans and advances-multiplied by a fixed factor 'm' -replaces gross income as the exposure indicator. The betas for retail and commercial banking are unchanged from the standardized approach. The ASA operational risk capital charge for retail banking can be expressed as:

$$K_{RB} = \beta_{RB} \times m \times LA_{RB}$$

Where,

K_{RB} is the capital charge for the retail banking business line

β_{RB} is the beta for retail banking business line, and

LA_{RB} is total outstanding retail loans and advances averaged over the past three years

m is 0.035.

Under the ASA, the banks may also aggregate retail and commercial banking using a beta of 15 %" (Basel Committee on Banking Supervision 2006).

Since most of the commercial banks in the UAE have exposure in the retail and commercial banking, we calculated the operational risk capital charge based on the ASA method. The total loans and advances of all the commercial banks in the UAE in 2005 was approx. AED 363 billion. Assuming all the loans as a part of retail and corporate loan (The corporate and retail loan account for approx. 80% while the loan to the government is around 13% of the total loan) the capital charge for the operational risk shall be 15% of 12.71 billion that is approx. 1.91 billion AED, which is significantly lower than the capital charge for operational risk based on the BIA method. When we take the three year average (as per the

requirements of the ASA), then the capital charge gets further reduced. Regarding the qualifying criteria and the supervisory requirements of the ASA (Refer paragraphs 660 to 663 in the Basel II document entitled “International Convergence of Capital Measurement and Capital Standards, A revised framework, June 2006”) it seems that most of the large and medium sized commercial banks are eligible. Therefore it is advisable for the UAE banks to opt for the ASA to avail the twin benefits mentioned above so that they are ready with the framework to eventually apply the AMA say by 2010-11.

CONCLUSION

Ever since the Basel II accord document has been made public, a lot of research is being conducted to understand the implications of the accord implementation on the banks and the economy as a whole. There has been a lot of effort to examine the measurement approaches of the operational risk for the purpose of maintaining the regulatory capital as well as the increasing the safety and security of the financial systems. We have analyzed the existing approaches of the measurement of operational risk and have come to the conclusion that the best suitable approach for the large and medium commercial banks in UAE is the Alternate Standardized Approach (ASA), which provides twin benefits to the banks: (1) reduction in the operational risk capital charge, and (2) an opportunity to embark on a robust operational risk framework so to have a smooth transition to the Advanced Measurement Approach eventually. The validity of the research findings is somewhat limited by the availability and the quality of data of UAE commercial banks. Out of 46 banks, we could manage the data on capital adequacy of only 31 banks. For the purpose of the impact of various approaches of capital calculation methods, we relied on the aggregated data of the commercial banks. The future research can be conducted based on disaggregated data of the banks and the implications of Basel II capital requirements on commercial banks.

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